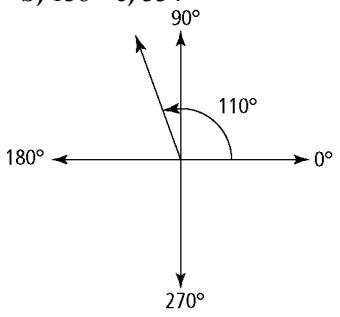
Chapter 4 BLM Answers

BLM 4–1 Chapter 5 Prerequisite Skills

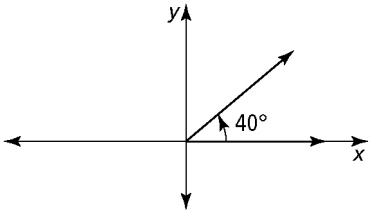
1. Estimates will vary. Actual measurements are as follows:

a) 52° **b)** 138° **c)** 334°

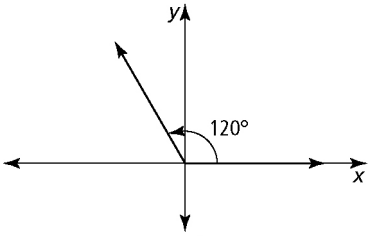
2. a)



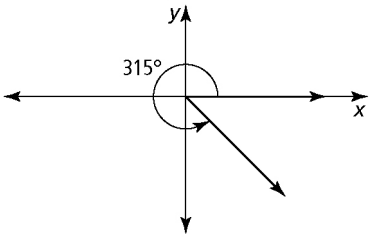
b)



c)



d)



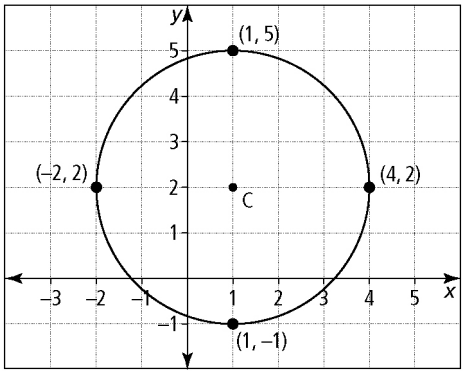
3. a) IV **b)** II **c)** I **d)** III **e)** IV **f)** II

4. a) 40° **b)** 40° **c)** 80° **d)** 85° **e)** 50.6° **f)** 6°

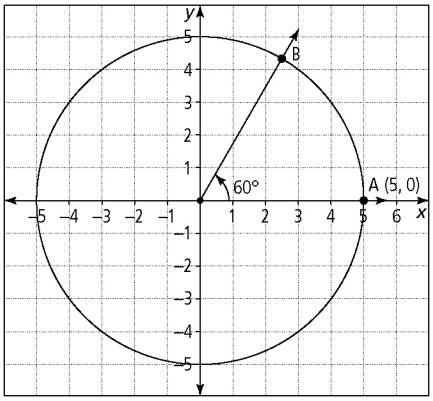
5. a) 12 756π; 40 074.2 km **b)** $\frac{47.1}{2\pi}$; 7.5 mm

c) $C = 23.25\pi$; 73.0 in.

6.



7. a)



b) $(10\pi)\left(\frac{1}{6}\right) = \left(\frac{5\pi}{3}\right)$ **c)** 5.2 units

8. a) $AB = \sqrt{41}$ **b)** $CE = 6\sqrt{3}$ **c)** $FG = 2$

9. a) 322° **b)** 252.5° **c)** 169° **d)** 132.9°

10. $\cos A = \frac{1}{\sqrt{5}}$; $\tan C = \frac{1}{2}$ **b)** $\sin Y = \frac{y}{3}$; $\tan X = \frac{x}{y}$

11. a) 0.59 **b)** 0.05 **c)** –0.58
d) –0.99 **e)** 19.08 **f)** –0.97

12. a) $6y(x - 2y)(x + 2y)$ **b)** $(x - 10)(x - 1)$
c) $3(2x - 1)(x - 3)$ **d)** $(3x + 2)(2x - 5)$

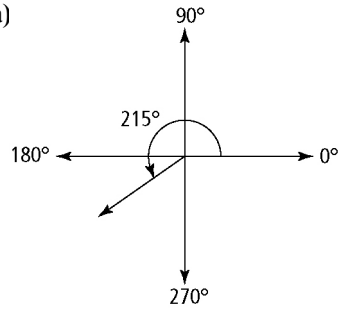
13. a) $x = \pm 3$ **b)** $x = \frac{3}{2}$ or 1.5

c) $y = -10$ or 3 **d)** $y = 4 \pm \sqrt{3}$

14. 31.95 cm

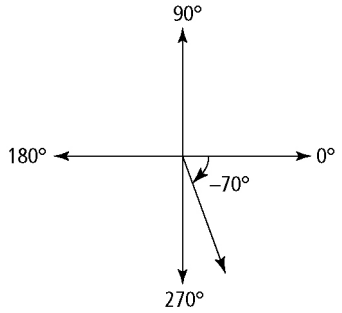
BLM 4–2 Section 4.1 Extra Practice

1. a)



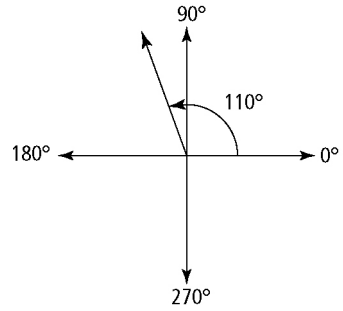
quadrant III

b)



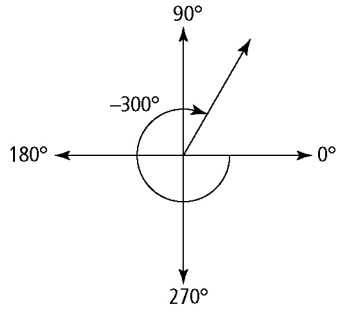
quadrant IV

c)



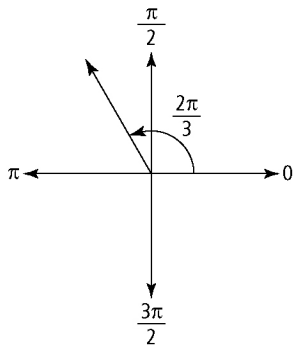
quadrant II

d)



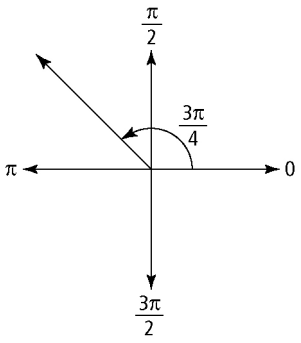
quadrant I

2. a)



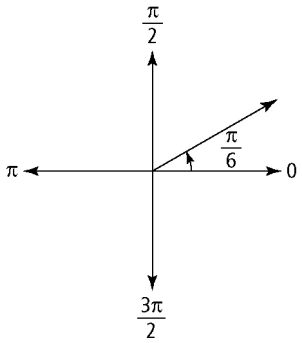
quadrant II

b)



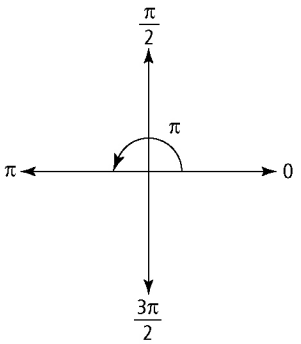
quadrant II

c)



quadrant I

d)



no quadrant

3. a) $\frac{5\pi}{6}, 2.62$ **b)** $\frac{4\pi}{3}, 4.19$

c) $\frac{\pi}{4}, 0.79$ **d)** $\frac{31\pi}{18}, 5.41$

4. a) 144° **b)** 150° **c)** 123.75° **d)** –315°

5. a) 183° **b)** 229° **c)** 344° **d)** –143°

6. a) 810°, 1170° **b)** $\frac{11\pi}{5}, \frac{21\pi}{5}$ **c)** 7.98, 14.27

7. a) subtract 360°

b) subtract 2π, and use fractions to determine the exact value

c) subtract 2π using your calculator, and then round your answer to the required accuracy

8. a) $75^\circ \pm (360^\circ)n$, where n is a natural number

b) $\left(\frac{\pi}{3} \pm 2\pi n\right)$ radians, where n is a natural number

c) $(1 \pm 2\pi n)$ radians, where n is a natural number

9. 20.9 cm

10. 1.43 radians

BLM 4–3 Section 4.2 Extra Practice

1. a) $x^2 + y^2 = 16$ **b)** $x^2 + y^2 = 5$
c) $x^2 + y^2 = 82.81$ **d)** $x^2 + y^2 = 121$

2. $\left(-\frac{5}{13}, \frac{12}{13}\right)$ and $\left(-\frac{2}{3}, -\frac{\sqrt{5}}{3}\right)$; When the coordinates are substituted into $x^2 + y^2 = 1$, the LHS equals the RHS.

3. a) $\left(-\frac{2}{3}, -\frac{\sqrt{5}}{3}\right)$ **b)** $\left(-\frac{3}{5}, \frac{4}{5}\right)$

c) $\left(\frac{5}{6}, -\frac{\sqrt{11}}{6}\right)$ **d)** $\left(\frac{4\sqrt{3}}{7}, \frac{1}{7}\right)$

4. a) $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ **b)** (0, –1)

c) $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ **d)** $\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

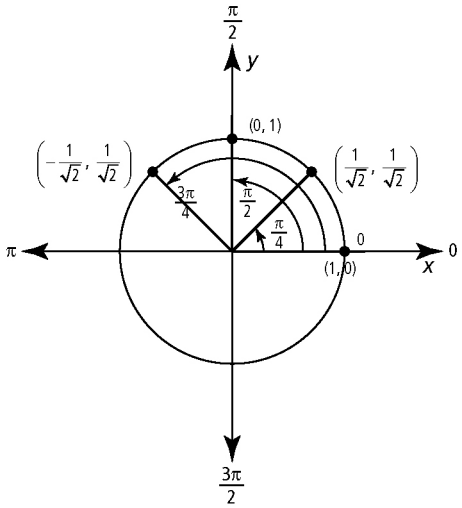
5. a) $\left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ **b)** $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

c) (1, 0) **d)** $\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

6. a) 225° **b)** 180° **c)** 315° **d)** 240°

7. a) 0π **b)** $\frac{5\pi}{3}$ **c)** $\frac{5\pi}{6}$ **d)** π

8.



9. a) $\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ **b)** $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

10. a) $\left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ **b)** $\left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

BLM 4–5 Section 4.3 Extra Practice

1. a) $\frac{1}{2}$ **b)** $-\frac{1}{2}$ **c)** –1 **d)** –1 **e)** $\frac{2}{\sqrt{3}}$ or $\frac{2\sqrt{3}}{3}$ **f)** –1

2. a) $\frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$ **b)** $-\frac{1}{2}$ **c)** –1 **d)** –1

e) $\sqrt{3}$ **f)** $\sqrt{2}$

3. a) 0.64 **b)** –0.82 **c)** –2.36 **d)** –1.19

4. a) –1.25 **b)** –0.73 **c)** 1.03 **d)** 0.68

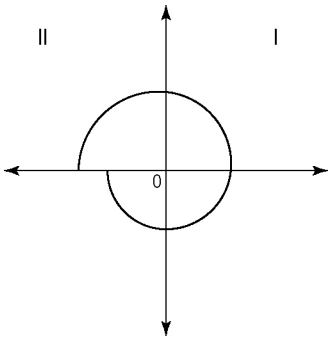
5. a) II or III **b)** I or II **c)** I or III
d) IV **e)** IV **f)** II

6. a) $-\sin 50^\circ$ **b)** $\cos 50^\circ$ **c)** $-\tan 80^\circ$
d) $-\csc 80^\circ$ **e)** $\cot 20^\circ$ **f)** $\sec 70^\circ$

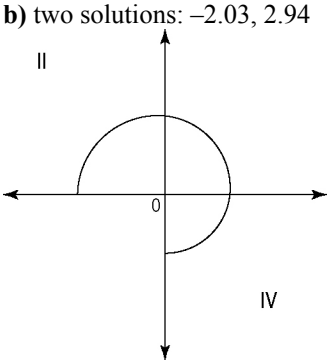
7. a) 135°, 315° **b)** –30°, 30°
c) 30° **d)** –270°, –90°, 90°, –270°

8. a) $\frac{\pi}{3}, \frac{2\pi}{3}$ **b)** $-\pi, \pi$ **c)** $\frac{2\pi}{3}, \frac{4\pi}{3}$ **d)** $-\frac{\pi}{4}, \frac{3\pi}{4}, \frac{7\pi}{4}$

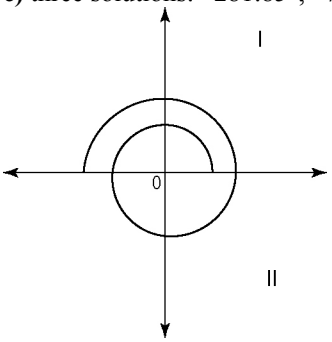
9. a) two solutions; 0.43, 2.71



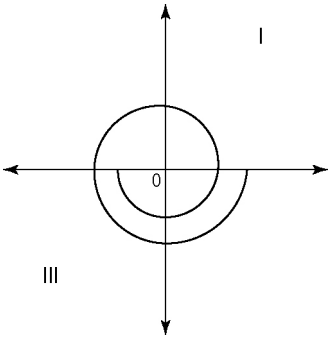
b) two solutions: –2.03, 2.94



c) three solutions: –281.85°, –78.15°, 78.15°



d) three solutions: –123.69°, 56.31°, 236.31°



10. $\sin\theta = -\frac{12}{13}$ $\quad \csc\theta = -\frac{13}{12}$

$\cos\theta = \frac{5}{13}$ $\quad \sec\theta = \frac{13}{5}$

$\tan\theta = -\frac{12}{5}$ $\quad \cot\theta = -\frac{5}{12}$

BLM 4–6 Section 4.4 Extra Practice

1. a) 60°, 300° **b)** 120°, 300°
c) 30°, 150° **d)** 120°, 240°

2. a) $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$ **b)** $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

c) $\frac{\pi}{2}, \frac{\pi}{4}, \frac{5\pi}{4}$ **d)** $\frac{\pi}{3}, \frac{5\pi}{3}$

3. a) $\frac{\pi}{2}$ **b)** $0, \frac{\pi}{3}, \frac{5\pi}{3}$ **c)** $-\frac{\pi}{2}, \frac{\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

4. a) 1.35, 4.49 **b)** 1.76, 4.90
c) 1.14, 2.00 **d)** 0.08, 3.22

5.

LS	RS
$\sin^2\theta - 1$	0
$= \left(\sin\frac{\pi}{2}\right)^2 - 1$	
$= (1)^2 - 1$	
$= 0$	

LS	RS
$\sin^2\theta - 1$	0
$= \left(\sin\frac{3\pi}{2}\right)^2 - 1$	
$= (-1)^2 - 1$	
$= 0$	

6. No. Example: The range of the cosine function is [–1, 1]. Cosine is undefined for values that are outside of this range.

7. a) 0.7854, 2.1910, 3.9270, 5.3326
b) 1.1071, 1.240, 4.2487, 4.3906
c) 0, 1.3258, 4.4674

8. $2\pi n,\ n \in \mathrm{I}$

9. $x = \pi n, -\frac{\pi}{2} + 2\pi n$

10. $(1+4n)\frac{\pi}{6},\ n \in \mathrm{I}$

BLM 4–8 Chapter 4 Test

1. C
2. A
3. A
4. C
5. D

6. a) Example: unitary method; $\frac{3\pi}{2};\ \approx 4.71$

b) Example: proportion method; $-3\pi;\ \approx -9.42$

c) Example: unit analysis; $\frac{5\pi}{6};\ \approx 2.62$

d) Example: unitary method; $\frac{4\pi}{3};\ \approx 4.19$

7. a) Example: proportion method; ≈ 186.21°
b) Example: unitary method; ≈ 22.92°
c) Example: unit analysis; –315°
d) Example proportion method; ≈ –306.53°

8. $\frac{9\pi}{2}$

9. a) $\theta \approx 133.69°$ or 2.33 **b)** $a \approx 31.85$ cm
c) $r \approx 6.99$ m **d)** $a \approx 4.28$ ft

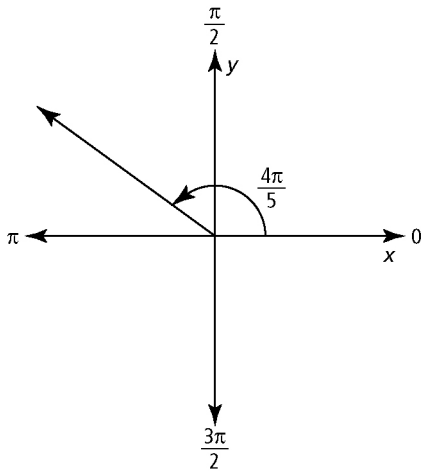
10. $\frac{-3}{4}$

11. 0.6

12. $\left(\frac{-1}{2}, \frac{\sqrt{3}}{2}\right), \left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

13. $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

14. a)



b) $\frac{4\pi}{5} + 2\pi n, n \in \mathrm{I}$

15. $\sin\theta = \frac{-4}{5}$, $\cos\theta = \frac{3}{5}$, $\tan\theta = \frac{-4}{3}$, $\csc\theta = \frac{-5}{4}$, $\sec\theta = \frac{5}{3}$, $\cot\theta = \frac{-3}{4}$

16. $-\frac{\pi}{4}, \frac{\pi}{4}$

17. a) Equation A: $\theta = \frac{\pi}{3}, \frac{2\pi}{3}$; Equation B: $\theta = \frac{\pi}{4}$

b) Equation C is the product of Equation A times Equation B (i.e., AB = C). Therefore, the solution to Equation C is the solutions to A and B: $\theta = \frac{\pi}{4}, \frac{\pi}{3}, \frac{2\pi}{3}$.